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The 1988 Drought: Its Impact on District Agriculture

NINETEEN eighty-eight will be remembered as the year of the drought. Crop producers experienced sharp drops in yields, while livestock producers faced higher feed costs. The drought slowed, but did not stop the agricultural recovery that started in 1984. Despite the drought, farmers and agricultural lending institutions improved their financial positions during 1988.

This article examines these and many other effects of the drought on the agricultural economy. The article first provides a brief overview of how the U.S. agricultural economy performed during 1988. The agricultural economy of states in the Eighth Federal Reserve District is then compared to U.S. agricultural performance.[1]

U.S. AGRICULTURE AND THE DROUGHT

By mid-August, the drought had affected all of the United States, except for the naturally dry Southwest and the East coast, with substantial effects on agricultural production and distribution. Low rainfall combined with high temperatures caused corn and soybean yields across the United States to fall by 29 percent and 21 percent, respectively. The decreased supplies sent commodity prices upward throughout the summer which helped to limit the drought's impact on some farmers. In addition to reduced supplies, additional problems arose in moving grain products from elevators to processors and export markets. Low water levels on major waterways slowed, and sometimes completely stopped, barge movement of grain.

Farm Finances

After four years of increases, net farm income is currently forecast to have shrunk to $40 billion in 1988.[2] Although this figure is down 14 percent from 1987, it is still three times larger than net farm income in 1983. The income statement of the farm sector since 1981 is shown in table 1. The 1988 forecast figures indicate that, while total farm receipts rose more than 9 percent in 1988, farm expenses climbed about 7 percent. Feed, fertilizer and machinery led the list of items increasing in cost. These increasing expenditures plus falling government payments and dwindling grain inventories resulted in lower net farm income.

[1]The Eighth Federal Reserve District includes all of Arkansas and parts of Illinois, Indiana, Kentucky, Mississippi, Missouri and Tennessee. The majority of this report, however, focuses only on the entire states of Arkansas, Kentucky, Missouri and Tennessee.

[2]U.S. Department of Agriculture, *Agricultural Outlook* (April 1989), p. 54, table 32.

Table 1
Farm Sector Income Statement (billions of dollars)

	1981	1982	1983	1984	1985	1986	1987	1988[1]
Farm receipts	$144.1	$147.1	$141.1	$146.8	$149.1	$140.2	$143.7	$157.0
Government payments	1.9	3.5	9.3	8.4	7.7	11.8	16.8	14.0
Total farm income	166.4	163.5	153.1	174.9	166.1	159.8	169.8	172.0
Total expenses	139.4	140.0	140.4	142.7	134.0	122.3	123.5	132.0
Net farm income[2]	26.9	23.5	12.7	32.2	32.3	37.4	46.3	40.0
Net cash income	32.8	37.8	36.9	38.7	46.6	51.4	57.1	58.0

[1]Values for 1988 are forecasts.

[2]Total net farm income includes the value of inventory changes. Net farm income totals may not add due to rounding. Data are not adjusted for inflation.

SOURCE: *Agricultural Outlook* (April 1989), p. 54, table 32.

While net farm income was expected to fall in 1988, net cash income from farming, another indicator of farm finances, was expected to rise slightly (see table 1). The difference between net farm income and net cash income from farming is that net farm income measures income largely generated from a given calendar year's production, regardless of whether the commodities are sold, fed or placed in inventory during the year. Net cash income from farming measures the total income that farmers elect to receive from their operation in a given calendar year, regardless of the amount of production or the year the marketed output was produced. It approximates the income stream available to farmers for purchasing assets such as machinery or land, retiring loans and covering all other expenditures. Since production was low in 1988, net farm income was also lower. But, since some farmers were able to sell stored grain at high prices, net cash income from farming was up slightly in 1988.

When the number of farms is taken into consideration, the financial picture changes very little for 1988. Real net farm income per farm is expected to have dropped about 16 percent from 1987 to 1988, while real net cash income from farming per farm is expected to have fallen less than 1 percent.[3] Real U.S. net farm income and real cash income from farming per farm since 1950 are shown in figure 1. During the past 30 years, real net farm income per farm has been trending upward, while the real earnings of farmers have been constant to declining. With fewer and fewer farms, each remaining farm gets a larger share of the relatively constant total farm earnings.[4]

Farm Balance Sheet

Despite declining net farm income, the balance sheet of the agricultural sector was expected to improve in 1988, chiefly because of rising land values. Farmland values were expected to increase approximately 4 percent in 1988.[5] While real estate values were improving, farmers continued to reduce their real estate debt, paying off nearly $4 billion in 1988. Non-real-estate debt increased about $1.1 billion, allowing total farm liabilities to fall for the fifth straight year to about $139 billion. Overall, the farm sector's debt-to-asset and debt-to-equity ratios improved for the third straight year (see figure 2).

Agricultural Trade

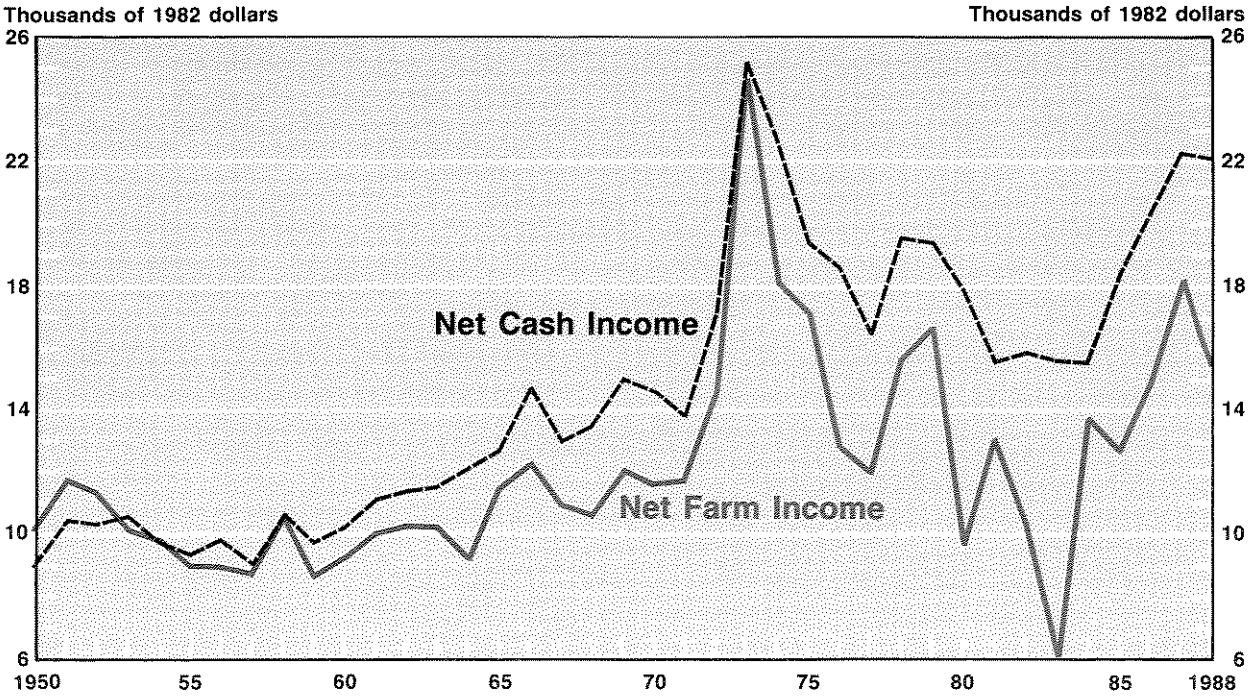
The summer drought had only a limited impact on agricultural exports. The carry-over of agricultural commodity stocks was large enough to handle increased export demand, despite decreased current year supplies. In 1988, net agricultural exports nearly doubled as exports

[3]The term "real" here refers to the fact that the data has been adjusted to take into account the impact of inflation.

[4]See Duncan (February 1989).

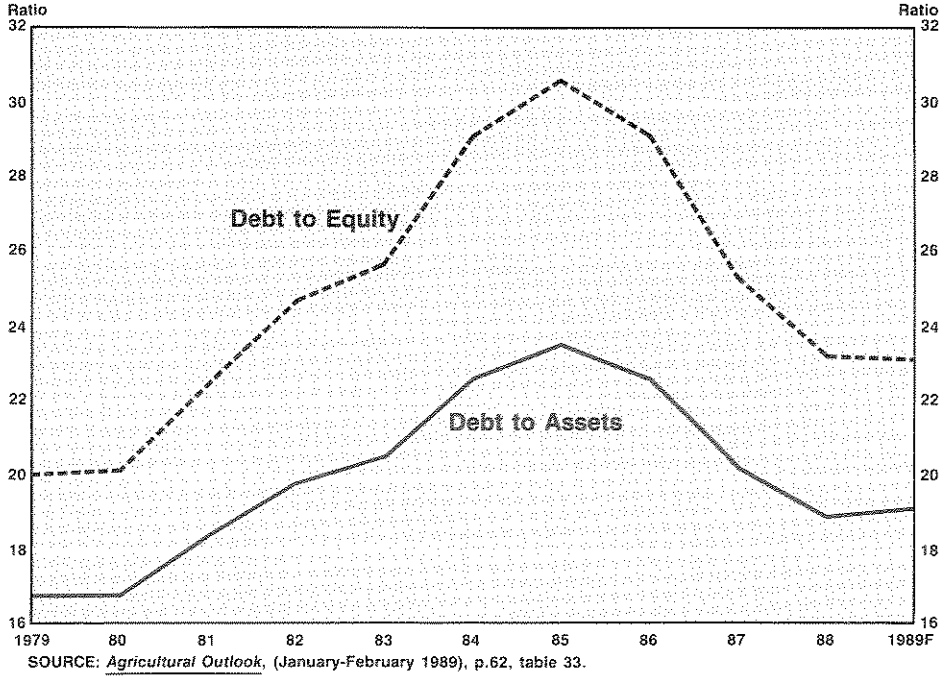
[5]U.S. Department of Agriculture (June 1988), p. 3.

Figure 1
Real U.S. Net and Cash Farm Income per Farm



SOURCES: *Farm Income Data: A Historical Perspective*, 1986, p. 16 and *Agricultural Outlook* (April 1989), p. 54, table 32.

Figure 2
U.S. Agricultural Balance Sheet Ratios



SOURCE: *Agricultural Outlook*, (January-February 1989), p.62, table 33.

reached their highest levels since fiscal year 1983. Simultaneously, agricultural imports reached a record high of $21 billion. Agricultural exports increased 27 percent in dollar value, while imports increased less than 2 percent.

The improved agricultural trade surplus was partially a result of the falling value of the dollar and continued government subsidization of exports. One example of a U.S. government export subsidy program is the Export Enhancement Program. This program essentially gives exporters a subsidy for every unit of grain sold so they can compete with other world exporters, mainly the European Community nations, who also subsidize their exports.[6]

Agricultural Lenders

Despite lower real net farm income, agricultural banks and the Farm Credit System continued to improve their financial positions in 1988. The number of agricultural bank failures in the United States dropped from 53 in 1987 to 24 in 1988. Similarly, agricultural banks reporting negative earnings fell from 488 in 1987 to 261 in 1988. In addition, loans delinquent 30 days or more at agricultural banks dropped to 3.77 percent of all agriculture loans. This compares with a delinquency rate of 5.55 percent through the same period last year. Furthermore, agricultural banks' return on assets increased 0.26 of a percentage point to 0.92 percent, while return on equity jumped more than 2 percentage points to 9.69 percent.

The Farm Credit System (FCS) also improved its financial position while undergoing a reorganization in 1988. In the reorganization, the Federal Land Banks (FLB) and the Federal Intermediate Credit Banks (FICB) of each district merged to form the Farm Credit Bank. The Farm Credit Bank and its affiliates provide farmers with long-term loans for land purchases as well as short-term loans for operating expenses. The FCS's Banks for Cooperatives also underwent a reorganization in which 11 of the 13 Banks for Cooperatives merged to form the CoBank. The CoBank provides loans to agricultural cooperatives. The Farm Credit Bank in conjunction with the CoBank make up the Farm Credit System.[7]

The Farm Credit System's performance improved in 1988 when compared to 1987. The FCS reported a combined net income of $704 million for 1988, compared with a net loss in 1987 of $17 million. A major factor in the improved 1988 results was a substantial negative provision for loan losses of $680 million for the year 1988, more than three times the negative provision of $196 million for 1987. In other words, the FCS decreased the amount of money it had set aside to cover loans that were at a high risk of defaulting. Although gross loans declined, the rate of decline was considerably less than in the three preceding years. While things appear to be improving for the FCS, problems still remain; in 1988, for example, the Federal Land Bank in Jackson, Mississippi, was placed in receivership.[8]

The Farmers Home Administration (FmHA) continues to struggle, but is improving in some areas. The FmHA serves as a lender of last resort for farmers who cannot secure loans elsewhere. In 1988, delinquencies of insured individual farm ownership loans increased by 2 percent. New agricultural loan volume fell 30.6 percent in 1988 when compared to 1987. The FmHA's current-year operating loss on farmer program loans of $8.3 billion was substantially less than last year's loss of $15.7 billion. The large operating loss in 1987 was partially due to an increase in the FmHA's allowance for loan losses.

Consumer Prices

Despite the drought's effect on commodity prices, the Consumer Price Index (CPI) for all food in 1988 rose near the 1987 rate, about 4 percent. However, food prices did increase more rapidly in the last two quarters of the year than in the first two, with food prices increasing at a 5.2 percent annual rate during the fourth quarter. Because commodity costs are a small part of the retail price of food, ranging from about 10 percent to 30 percent, only small upward adjustments in retail prices are needed to reflect farm price increases.[9]

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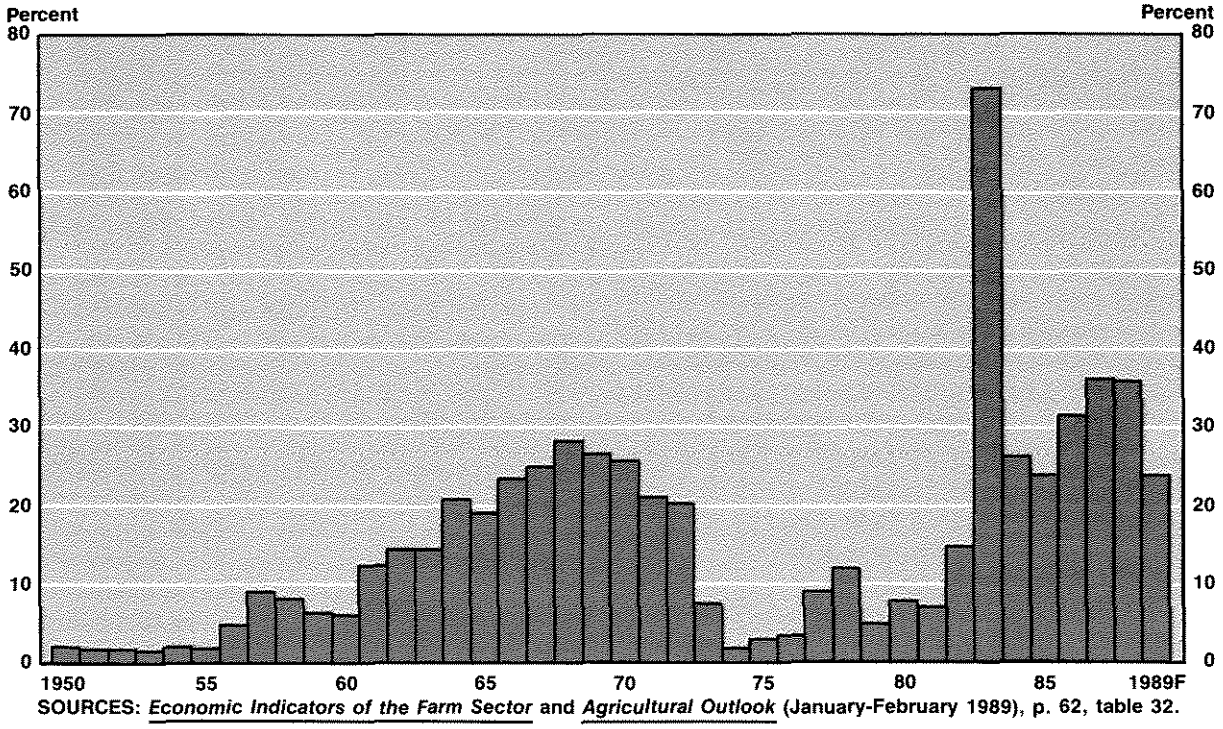
[6]See Coughlin and Carraro (November/December 1988).

[7]The Farm Credit System is a nationwide system of federally chartered agricultural lending institutions cooperatively owned by their borrowers.

[8]Federal Farm Credit Banks Funding Corporation (March 1, 1989).

[9]U.S. Department of Agriculture (July 1987), p. 12.

Figure 3
Government Payments / Net Farm Income



SOURCES: *Economic Indicators of the Farm Sector* and *Agricultural Outlook* (January-February 1989), p. 62, table 32.

Among food items, fresh fruit and poultry registered price increases of approximately 8.3 percent and 7.2 percent, respectively.[10] Other items with price increases of more than 5 percent included beef, fish, fresh vegetables and cereal and bakery products. While poultry price increases were, in part, due to drought-induced production losses, increased consumer demand also helped push retail prices higher. The United States Department of Agriculture estimates that the drought added only 0.5 percent to the food CPI in 1988.[11] The only major food item whose price declined was pork; its retail price fell about 3 percent last year.

GOVERNMENT SUPPORT

Direct government payments provided more than 20 percent of U.S. net farm income for the sixth consecutive year in 1988. Government payments as a percent of net farm income have been abnormally high since the record level of 73 percent in 1983 when the Payment-In-Kind program was enacted.[12] Historical levels of government payments as a percentage of net farm income are shown in figure 3. Although direct government payments to farmers in 1988 declined more than 16 percent from 1987 levels, net farm income fell almost 14 percent. Thus government payments made up 35 percent of net farm income last year. In 1989, direct government payments to farmers are predicted to fall to $11 billion, or about 24 percent of net farm income.[13]

Commodity program outlays fell in 1988 and will continue to fall in 1989 for two main reasons. First, loan rates and target prices for most

[10]Based on comparison of the annual averages of each product's 1987 and 1988 CPI.

[11]U.S. Department of Agriculture, *Agricultural Outlook* (January/February 1989), p. 35.

[12]The Payment-In-Kind program compensated farmers for taking land out of production by paying them with government-owned grain. If a farmer took ground normally planted in corn out of production, he was compensated with government-owned corn.

[13]U.S. Department of Agriculture, *Agricultural Outlook* (April 1989), p. 54.

major commodities fell in 1988 and are scheduled to decline again in 1989. Second, higher grain prices resulting from the drought have decreased the amount of deficiency payments to farmers. Deficiency payments are the target price minus the loan rate, or the target price minus the cash price, whichever is smaller. All major commodity cash prices were above the loan rate this year. Thus, declining deficiency payments have resulted from lower target prices and higher cash prices.

In contrast, one agricultural program with rising expenditures is the Conservation Reserve Program (CRP). The CRP takes land out of agricultural production for 10 years or more in exchange for annual payments to the land owner. The CRP differs from other commodity programs that are run generally on an annual basis in that it is a multi-year agreement. In 1988, an additional 8.5 million acres were enrolled in the CRP; the total enrolled acreage now runs more than 24 million acres. Estimated total 1988 CRP payments for rent and cover crop establishment were $1.5 billion.[14] An additional 3.5 million acres are scheduled to be taken out of production in 1989. In 1989, fewer acres will be enrolled, and therefore less money will have to be spent establishing cover crops for erosion control.

Farmers also got an income boost to counteract the adverse effects of the drought from payments approved by Congress under the Disaster Assistance Act. Budgeted expenditures for the program are $3.9 billion.[15] These funds are to be paid out in 1988 and 1989. Corn farmers are expected to be the largest recipient of aid, getting about $1.7 billion. Payment rates differed depending on the extent of crop damage. For production losses between 35 percent and 75 percent, the payment rate was for 65 percent of the normal amount of the crop grown on the farm. For losses more than 75 percent, the payment rate was 90 percent of normal production. Disaster payments to crop producers were limited to $100,000 per person.[16] Any person with revenues more than $2 million was not eligible for assistance.

Drought-stricken livestock producers also received disaster assistance. The Secretary of Agriculture had several options by which to provide assistance. The two options used most extensively included selling Commodity Credit Corporation-owned feed grain at 75 percent of the county loan rate and partially reimbursing livestock producers for purchased feed and transportation expenses. Low-interest disaster loans were also available from the FmHA.

EIGHTH DISTRICT AGRICULTURE AND THE DROUGHT

The impact of the drought on District agriculture varied from state to state. All states reported growing season rainfall amounts that ranged from eight to 11 inches below normal (see table 2). While the drought reduced output and net farm income, it did not cripple District agriculture.

District waterway activity reflected the severity of the summer drought. In mid-June, water depth at the mouth of the Ohio River at Cairo, Illinois, was 17 feet below normal. Channel widths on parts of the river system narrowed from 500 feet to 200 feet. At Memphis in early August, the Mississippi River flow was 46 percent below normal for that time of year.

Despite low water levels, total grain shipments on the Illinois and Mississippi waterways in 1988 were actually larger than total 1987 shipments. Grain shipments, however, did fall below average from June through November. Monthly grain shipments in 1988 are compared with 1981-87 average monthly grain shipments in figure 4. July saw the sharpest drop in movement of grain from average, with shipments falling 20 percent.

Barge rates skyrocketed in the last week of June as navigation problems became widespread. For example, rates from Peoria to New Orleans averaged $17.44 per ton in that week in contrast to $6.37 per ton the prior week. Rates, however, declined through August, then started climbing again as prospects for Soviet corn buying increased in September. In August, barge

[14]Calculated as (total acreage taken out of production x average weighted rental rates for land in CRP) + (estimated cost sharing for cover crop establishment x new acreage enrolled in 1988). Numbers used in this estimation were obtained from the Agricultural Stabilization and Conservation Service.

[15]U.S. Department of Agriculture, *Agricultural Outlook* (September 1988), p. 28.

[16]The $100,000 limit per person generally meant a $100,000 limit per farm. The ASCS reviewed each application and determined how much aid each applicant could receive.

Table 2

Growing Season Rainfall for Selected Areas (inches)

	1988 rainfall April-September	Normal[1] rainfall April-September	Departure from normal
N. Little Rock, AR[2]	28.45	37.76	– 9.31
Paducah, KY	15.21	23.79	– 8.58
St. Louis, MO	11.77	21.65	– 9.88
Memphis, TN	14.62	25.80	– 11.18

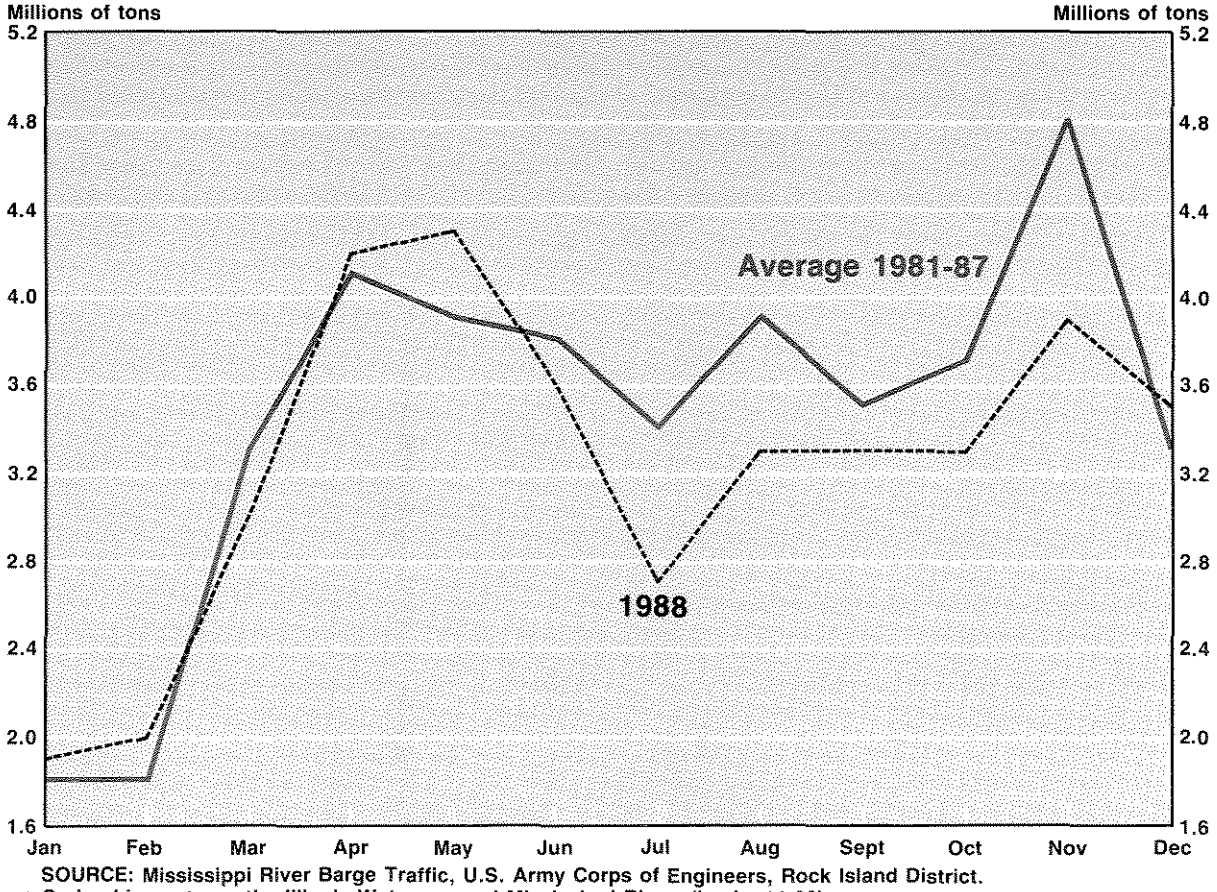
[1]Normal is defined as a 30-year average.

[2]Cumulative rainfall, January through September.

SOURCE: Agricultural Statistical Service of the individual states.

Figure 4

Grain Shipments[1]



SOURCE: Mississippi River Barge Traffic, U.S. Army Corps of Engineers, Rock Island District.

[1] Grain shipments on the Illinois Waterway and Mississippi River, (Locks 11-22).

Table 3
District Crop Yields: 1988 vs. 1985-87 Average Yield

United States	Percent Difference
Corn	−28.8%
Cotton	−0.6
Rice	−0.5
Sorghum	−6.3
Soybeans	−20.5
Tobacco	−0.3
Wheat	−7.2

Missouri	Percent Difference
Corn	−32.7%
Cotton	−9.4
Sorghum	−2.4
Soybeans	−22.0
Wheat	27.1

Kentucky	Percent Difference
Corn	−26.5%
Soybeans	−12.6
Tobacco	−1.0
Wheat	34.0

Arkansas	Percent Difference
Cotton	4.7%
Rice	2.9
Sorghum	−1.0
Soybeans	7.9
Wheat	39.5

Tennessee	Percent Difference
Corn	−16.7%
Cotton	−15.0
Soybeans	−1.3
Tobacco	0.0
Wheat	41.5

SOURCE: Agricultural Statistical Service of the four states.

rates were only 6 percent above the January-to-May average rate. The decline in rates in August was due to decreased demand for exports and increased grain holdings by producers in anticipation of higher grain prices.[17]

Crop Production

The most obvious effect of a drought is its effect on crop yields. Crop performance in the District was varied. U.S. and state average crop yields are shown in table 3.

Corn yields were most affected by the drought. Major producing states in the District suffered large yield losses that ranged from 17 percent in Tennessee to 33 percent in Missouri.[18] Sorghum yields were also down slightly. Soybean and cotton yields were mixed across the District. For example, soybean yields rose in Arkansas and fell in Kentucky, Tennessee and Missouri, while cotton yields rose in Arkansas and fell in Missouri and Tennessee. Tobacco yields were essentially unchanged in Kentucky and Tennessee.

Wheat and rice crop performance were less affected by the drought. Since winter wheat crops require most of their moisture in the spring, the summer drought did little damage to the crop. In fact, most District states posted sizable gains in wheat yields. Rice production was not damaged by the drought since much of the crop's water comes from wells and not natural rainfall. Nonetheless, a more normal

[17]U.S. Department of Agriculture (January 1989), pp. 25-27.

[18]Arkansas is not a major corn-producing state.

rainfall pattern in the southern states did help rice and other crops throughout the summer.

On a state basis, Arkansas fared the best overall with yield increases in all crops except sorghum. Tennessee and Kentucky, while experiencing decreased yields, faced losses that were generally less-than-average U.S. yield losses. Missouri experienced large yield losses in both of its most important cash crops, soybeans and corn.

Livestock Production

Red meat production in the District increased by about 3 percent in 1988.[19] Kentucky led the District with a 9.4 percent increase in red meat production. Missouri also increased red meat production, while Arkansas and Tennessee decreased production.

U.S. broiler production increased more than 4 percent in 1988 to about 16.1 billion pounds, after increasing nearly 9 percent in 1987. Arkansas, the nation's largest broiler producer, increased production about 3.5 percent in 1988.

District Farm Income

District net farm income increased by 26 percent in 1987, after falling the two previous years. District 1988 data is available with a one-year lag, but with 1988 U.S. net farm income expected to drop 14 percent, District farmers can expect similar results.[20] Similar to the nation, total farm cash receipts in the District for the first three quarters of 1988 were well ahead of cash receipts for the same period a year ago. All District states were reporting increased crop receipts and livestock receipts.

While farm receipts were up, so were expenditures for District farmers. Especially hard-hit were hog producers. Profit margins were squeezed from both sides as increased inventories pushed hog prices lower and the drought pushed input prices higher. Cattle producers, while also facing higher input costs, enjoyed market prices that were generally higher than 1987 prices.

Broiler producer net returns went as high as 20 cents per pound during July and averaged nearly 5 cents for the year. Higher broiler prices were likely a result of heat stress on production and increased retail sales efforts by fast food restaurants and grocers.

District Agricultural Lenders

District agricultural bankers improved their financial position again in 1988, outperforming, on average, U.S. agricultural banks as a whole. U.S., District and state data pertaining to agricultural bank performance are shown in table 4.

In 1988, District banks had both higher returns on assets and equity than did the U.S. agricultural banks on average.[21] The District's agricultural loan net losses as a percent of all agricultural loans was below the national average, while the District's 30-day-or-more delinquent agriculture loans as a percent of total agricultural loans was higher than the U.S. average. The District's non-performing agricultural loans fell for the third straight year to 5.06 percent of all agricultural loans. The number of agricultural banks with negative earnings fell in both the nation and the District.

With respect to the individual states, Tennessee agricultural banks had the highest return on assets and Indiana the lowest. Missouri had the highest return on equity, while Illinois had the lowest return on equity. All District states improved their agricultural losses as a percent of total agriculture loans during 1988. Furthermore, non-performing agricultural loans as a percent of total agricultural loans fell in all states except Tennessee.

Mississippi agricultural banks saw a substantial improvement over 1987. Returns on both assets and equity went from negative to positive values in 1988. Return on assets increased 1.4 percentage points and return on equity jumped 17.8 percentage points.

Both of the District's Farm Credit Banks improved their financial positions during 1988.[22]

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[19]Red meat production includes total beef, veal, pork, lamb and mutton slaughtered in federally inspected and other plants, but excludes animals slaughtered on farms.

[20]Carraro (1988) notes that District net farm income closely follows U.S. net farm income.

[21]Based on fourth-quarter FDIC Reports of Condition and Income for Insured Banks.

[22]The two Farm Credit Banks in the District are the St. Louis branch, covering the states of Arkansas, Illinois and Missouri, and the Louisville branch, covering Indiana, Kentucky, Ohio and Tennessee.

Table 4
U.S. and District Agricultural Banking Data

	U.S.		District	
	1988	1987	1988	1987
Banks with negative earnings	261	488	11	29
Return on assets	0.92	0.66	1.04	0.76
Return on equity	9.69	7.21	10.9	8.1
Ag. loan losses/Total ag. loans	0.59	1.88	0.4	2.49
Ag. nonpf. loans/Total ag. loans[1]	3.77	5.55	5.06	6.94

	Arkansas[2]		Illinois[2]		Indiana[2]		Kentucky[2]	
	1988	1987	1988	1987	1988	1987	1988	1987
Banks with negative earnings	5	5	1	11	1	1	0	1
Return on assets	1.05	0.96	0.94	0.7	0.9	0.51	1	0.91
Return on equity	10.34	9.17	10.14	7.71	10.34	5.94	10.27	9.51
Ag. loan losses/Total ag. loans	0.31	1.13	0.29	3.03	1.01	2.49	0.5	2.2
Ag. nonpf. loans/Total ag. loans[1]	2.75	3.08	5.73	8.36	7.41	10.93	4.92	5.54

	Mississippi[2]		Missouri[2]		Tennessee[2]	
	1988	1987	1988	1987	1988	1987
Banks with negative earnings	0	2	4	8	0	1
Return on assets	0.98	−0.42	1.17	0.86	1.21	0.91
Return on equity	11.54	−6.26	12.32	9.13	11.25	9.02
Ag. loan losses/Total ag. loans	0.34	3.31	0.45	2.26	1.36	8.51
Ag. nonpf. loans/Total ag. loans[1]	4.14	9.9	5.96	7.4	4.82	3.08

[1]Nonperforming loans are defined as those loans that are 30 days or more delinquent.

[2]State data only includes banks within the Eighth District.

SOURCE: Fourth-Quarter FDIC Reports of Condition and Income for Insured Commercial Banks.

The St. Louis branch had a net income of $99.3 million in 1988, up from $10.4 million last year. The Louisville branch generated a $3.6 million net income, which included an extraordinary $92 million loss on the restructuring of high-cost debt. This is the first year since 1983 that the Louisville branch has had positive net income; in 1987, the branch lost $25.1 million.

SUMMARY

The summer drought of 1988 has left its mark on the agricultural economy. Real net farm income is lower, consumer prices are slightly higher and drought conditions remain in some areas. Despite lower yields and higher input costs, the average U.S. and District farmer improved his balance sheet in 1988. While most of the results of the drought were negative, the drought has had one positive effect on the farm economy. The combination of lower production and continued strong consumption has left grain stocks at their lowest level in years. These low grain stocks will provide price support for commodities in 1989.

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